The Imperial Forestry Institute

University of Oxford

THIRTY-SECOND ANNUAL REPORT

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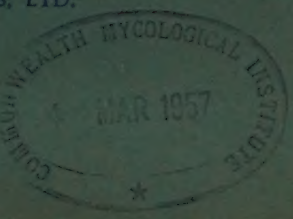

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THIRTY-SECOND ANNUAL REPORT OF THE IMPERIAL FORESTRY INSTITUTE ACADEMIC YEAR, 1955-56

Introduction. On 1st October, 1955, the School of Forestry celebrated its Jubilee, having been brought to Oxford from Coopers Hill in 1905. About 130 past and present members of the School and staff attended the celebration, which included the planting of a commemorative Jubilee oak tree in Bagley Wood. The tree was planted by Mr. A. E. Osmaston, the senior of the first group of students (those who came from Coopers Hill in 1905), assisted by Mr. R. J. Day, a final year student of 1955. Last year the hope was expressed that it would be possible to establish a prize to be known as the School of Forestry Jubilee Prize. Owing to the generosity of past and present members of the School this has been done. A prize will be awarded each year to the most meritorious undergraduate completing his studies for the Forestry Degree. The first prize was awarded this year, the prizeman being a New Zealand Government Scholar, R. T. Fenton

It is with great regret that we have to record the death of Dr. R. N. Chrystal on 16th August, 1956. Dr. Chrystal joined the Department as Forest Entomologist in 1925 and remained with the Department until he retired in 1951. Many of his former students, both in this country and abroad, will remember the kindly encouragement and help he gave so unstintingly to those interested in his subject. Since his retirement from the University Dr. Chrystal had spent a good deal of time teaching in the various Forestry Schools of the Forestry Commission, and as recently as last winter visited Cyprus at the invitation of the Cyprus Forest Department to make a survey of forest insects.

We also regret to have to record the death of D. W. T. Pedder, who was drowned in a gallant, but unsuccessful, attempt to rescue another. Mr. Pedder took his degree in 1953 and joined the Forestry Service in Northern Rhodesia.

International Union of Forest Research Organizations Congress. The Twelfth Congress of the International Union of Forest Research Organizations was held at Oxford from 6th to 14th July. Forty-one countries were represented by two hundred and thirty-seven delegates: in addition five representatives of the Food and Agriculture Organization of the United Nations attended.

Students. The number attending courses throughout the year was forty-eight.

Nineteen students were successful in the examination for the Forestry Degree. The classes obtained were two Firsts, six Seconds, six Thirds, four Fourths, plus one who had been too long at the University to obtain a Class. Of these, three were Colonial Forest Probationers who returned to their Colonies; two were awarded Beaverbrook Fellowships to the University of New Brunswick; one obtained a post with the Colonial Forest Service, and has gone out to Northern Rhodesia; one took the post of Game Warden in Uganda; one was a Scholar from New Zealand, and has returned to join the New Zealand Forest Service; one obtained a post with the Forestry Commission; three returned to family estates (one in S. W. Africa and two in Southern Rhodesia); two were Nigerians who have returned to join the Nigerian Forest Service; two obtained employment in private forestry, an Indian returned to India to seek employment; one man has still to undertake his National Service, and one is still seeking employment. The student who last year joined an Oxford University Expedition to Borneo has now obtained employment in private forestry.

There were eleven students in the junior year.

The Forest Officers' course was attended by only four officers of the Colonial Forest Service. They came from Malaya (2), Tanganyika (1), and Cyprus (1). This was the smallest number during the last 10 years and is partly due to revised arrangements providing for postponement when thought desirable in individual cases.

Again this year, only one Pakistani Forest Officer (from Punjab) attended the course, but three Indian Forest Officers (from West Bengal, Bihar and Kashmir) attended. They were joined by a Forest Officer from the Ceylon Forest Service, who came to England for a year under the Colombo Plan.

Research Students. Two students successfully submitted theses for the D.Phil. Degree. The theses were entitled, 'A study of some aspects of the significance of carbohydrates in soil processes', and 'Some physico-chemical properties of moorland soils as related to afforestation with particular reference to pH, base-exchange, aerobic, and nutrient status'. Two students successfully submitted theses for the B.Sc Degree, their subjects being 'Taxonomic and ecological study of the genus Terminalia' and 'Biological and ecological studies of British larch sawflies and the effect of defoliation on the growth of larch'. Seven students from Denmark (1), Canada (3), India (2) and Ceylon (1) successfully submitted theses for the Diploma in Forestry. The titles of the theses were: 'The factors determining the suitability of exotic species for use in plantations with special reference to intraspecific variation'; 'A taxonomic and ecological study of *Picea glauca* and *Picea engelmannii* in North America'; 'A study of the factors which are likely to govern future supplies of sawn softwood from British Columbia to the United Kingdom'; 'Some principles of forest taxation with particular reference to British Columbia'; 'Counter erosion measures applicable under the climatic and topographic conditions of Jammu and Kashmir'; 'The bearing of recent European

forest policies on the development of forestry in West Bengal, India'; and, 'Climate and the distribution of vegetation in Ceylon'.

Other Students. Under arrangements made by the British Council, a professional forester from Finland spent the year here; he was engaged mainly on a study of forest economics. During Hilary Term, we were glad to welcome two students from Burma, one a former student. Two Forest Officers from Thailand joined the course during the year, one only for Trinity Term, but the other hopes to remain for two years.

Prizes. The Schlich Memorial Prize was not awarded this year. The first award of the School of Forestry Jubilee Prize was made to R. T. Fenton.

Instructional Tours (1) The Introductory Tour in Britain, for students about to start their forestry course and for those from overseas unfamiliar with British forests and forestry, was made just before Michaelmas Term. The Tour was conducted by Mr. F. C. Osmaston. Forests visited included the State Forests of Dean, Tintern and Glasfynnydd, and Major Ackers' Estate at Huntley, Gloucestershire.

(2) *Western France.* A party of eleven junior students, five forest officers from India, Pakistan, Ceylon and Kashmir, an F.A.O. Scholar from Burma, a Colombo Plan Scholar from Thailand and a District Officer of the U.K. Forestry Commission, visited the forests of Normandy and the Landes in March. The tour was conducted by Mr. Edwardson accompanied by Mr. Gordon

Mr. Gordon then took the four forest officers from India, Ceylon and Kashmir to Switzerland to visit the works of the Wyssen Skyline-Cranes at Reichenbach.

(3) *Eastern France and Switzerland.* The twenty senior students together with a Forest Officer from the Queensland Forest Service visited forests in the Vosges and Jura during the Easter Vacation. The tour was conducted by Dr. E. W. Jones and Mr. F. C. Osmaston.

(4) *Postgraduate Tour in Great Britain.* Four forest officers of the Overseas Service, four officers from India, Kashmir and Ceylon, a Colombo Plan Scholar and a Gold Coast undergraduate made a six-day tour in North Wales and N.W. England under the leadership of Mr. Edwardson, accompanied by Mr. Gordon. The route followed was based on the North Wales tour made in the autumn by I.U.F.R.O. delegates, and the Institute is grateful to the officers of the Forestry Commission for making available the copious tour notes. Forestry Commission forests visited, by kind permission of the Conservators of North Wales and North West England, were Gwydyr, Newborough, Dovey, Dyfnant, Mathrafal and Kinver nursery. Mr. Howard, of Liverpool Corporation, North Wales, showed the party over the Lake Vyrnwy woodlands, and Major Ackers kindly came from Huntley to guide the party over Leighton Hall woods.

(5) *Sweden.* Four Forest Officers of the Overseas Service, with three Forest Officers from India and Ceylon, one from Thailand, two from Malaya, and one from Northern Rhodesia, plus an undergraduate from New Zealand and two Forestry Probationers from Northern Rhodesia and Kenya (the two latter for part of the time only) visited

Sweden for two weeks under the leadership of Colonel A. H. Lloyd and Mr. F. C. Osmaston. The range of subject matter seen covered the integration of forest industry so that waste is almost absent, the foresight, skill and practical research work of the big companies, the organization of higher and lower forest education, the organization of the State Forest Service separate from that of private forests, the outline of research work in Stockholm, tree breeding at Ekebo and methods of management by stand development types, age and site classes. The thanks of the Department are extended to Generaldirektor E. W. Höjer, of the State Forest Service, who organised the tour, and to the owners of the various factories and woods visited.

Additional Courses and Tours. (1) *Course in Forestry for the British Council.* At the request of the British Council, the Institute, in collaboration with the Forestry Commission, organised a two weeks' course on 'Forestry in Britain' for sixteen forest officers and research workers from seven European countries. The first four days included lectures at Oxford on the main aspects of British forestry by Lord Bolton, Mr. Langshaw Rowland, Mr. O. J. Sangar, Mr. J. Macdonald, Mr. W. A. Cadman, Professor Champion and Dr. L. Chalk. Local visits were made to Bagley Wood, Wytham Wood, Kennington nursery, Lord Parmoor's beechwoods in the Chilterns and a Stokenchurch chair factory. The remainder of the course comprised a tour of selected forests in the south of England, conducted by Mr. Edwardson. A day was spent covering the principal sections at the Forestry Commission Research Station (Alice Holt). Queen Elizabeth (Buriton) Forest was seen *en route* to a two-day stop in the New Forest (including Wareham). Later, from Monmouth, three days were spent seeing Dean Forest, Highmeadow and Tintern Forest; and the last day was spent on Garnons Estate, the party being conducted by Sir Richard Cotterell.

Thanks are due to the Forestry Commission officers and owners and agents for the assistance with talks and for permission to visit the various woodlands.

U.K. Forestry Commissioners. The Chairman of the Forestry Commission and the Forestry Commissioners visited the Institute on 20th April. They spent the morning visiting the various sections and discussing the work going on in them, and in the afternoon went to Wytham Woods.

Tour by the Swedish State Forester Training School. Preliminary arrangements were made by Mr. Edwardson for a study tour in North England and Scotland by a party of foresters in training from the Swedish State Forester Training School at Skinnskatteberg. The Education Branch of the Forestry Commission undertook the organization of the visit.

Working Plans. The practical work was again carried out in the New Forest from the Forestry Commission hostel, Northerwood House, under the supervision of Mr. Osmaston, helped by Mr. Edwardson and Dr. Handley.

Utilization Course. Final-year students spent a day at the Forest Products Research Laboratory at Princes Risborough, and also visited

Messrs. Plumridge Sawmills at High Wycombe. Several Forest Officers visited the Forest Products Research Laboratory to discuss particular subjects. Special thanks are due to the Director and those members of his staff who gave demonstrations, etc.

Vacational Practical Work. Undergraduate students are expected to carry out some practical work in the forests during Long Vacation. Nine students worked for six weeks in Norway under arrangements made by Mr. Ihlen of Norske Skogselskap and four worked with the Ontario Forest Department, arrangements being made by Mr. A. P. Leslie of the Department of Lands and Forests, Ontario. Other first-year students worked in Forestry Commission Woods in Yorkshire and Wales. We are greatly indebted to all those who have helped to provide these opportunities of practical experience which is a most valuable complement to studies in the School.

Excursions. During Trinity Term the Forest Officers made excursions to Alice Holt Research Station (Forestry Commission), the Directorate of Colonial Surveys (Tolworth), Cirencester Estate, the property of Earl Bathurst, the timber yards of Messrs. William Mallinson and Sons Ltd., London, the furniture factory and timber seasoning yard of Messrs. E. Gomme Ltd., of High Wycombe, and the Long Ashton Research Station, Bristol. The final year students visited Cirencester Estate, Windsor Great Park, Alice Holt Woodlands, woods belonging to Mr. F. E. Workman, at Woodchester, near Stroud, and the Bridge Street Saw Mills, High Wycombe.

The junior year students visited local woods for field study of silviculture and soils with Dr. Jones. Wytham Wood has again proved useful for demonstration purposes.

Thanks are tendered to all who permitted students to visit their woods and works.

Discussions. During Michaelmas and Hilary Terms, weekly discussions of forest topics of general interest for Colonial Forest Officers were organized, as usual. During Trinity Term, short papers in selected topics (usually the Forest Officer's 'Advanced Study') were presented by the same group, each paper being followed by discussion.

Seminars on Regeneration of Tropical Forests. Five seminars on this subject were arranged during Michaelmas Term, this method being considered preferable to lectures .

Visiting Lecturers. The usual series of invited lectures in Hilary and Trinity Terms were given with a different lecturer each week. These lectures are primarily for the post-graduate class, dealing mainly with problems not usually covered by the staff of the Department. The lectures were followed by questions and discussion.

The subjects dealt with were:

(1) *Some aspects of the use of air photographs in Forestry.* Mr. R. G. Miller, Deputy Director, Forest Air Survey Centre, at Directorate of Colonial Surveys, Tolworth.

(2) *The use of hardwoods in pulp and fibre board industry in the tropics.* Mr. T. L. Raine, of Bowater's Lloyd Pulp and Paper Mills Ltd.

(3) *Seasoning and Preservation.* Mr. E. H. Nevard, Chairman of the Technical Committee of British Wood Preserving Association.
(4) *Tree nutrition in forest nurseries including maintenance of fertility.* Miss B. Benzian, Rothamsted Experimental Station.
(5) *The Nature of Tropical Rainfall.* Dr. R. P. Beckinsale, School of Geography, Oxford.
(6) *Primitive man in relation to forestry.* Professor F. E. Zeuner, Institute of Archaeology, University of London.
(7) *The Climax Concept.* Professor W. H. Pearsall, Department of Botany, University College, London.
(8) *Forest Tree Breeding.* Mr. J. D. Matthews, Geneticist, Forestry Commission.
(9) *Influence of termites on reforestation.* Mr. W. A. Sands, Termite Research Unit, Commonwealth Institute of Entomology, The British Museum (Natural History).
(10) *Co-operation in forestry matters between owners.* Mr. A. P. Long.
(11) *Water relations of vegetative cover.* Dr. H. L. Penman, Rothamsted Experimental Station.
(12) *Land use problems as affecting forestry.* Professor L. Dudley Stamp, London School of Economics.
(13) *Problems of game conservation in relation to forestry.* Captain C. R. S. Pitman.
(14) *The economic aspects of mechanization for forestry in the tropics.* Mr. G. W. Houlding of the United Africa Company.

Assistance from other Departments, etc. Special courses in surveying and soil science were given by members of these two Departments to the Forestry students. Mr. J. Fraser Scott, Assistant to the Reader in the Design and Analysis of Scientific Experiment and Mr. G. B. Masefield, the University Lecturer in Colonial Agriculture, also gave courses to the senior year and postgraduate students. The thanks of the Department are extended to all lecturers concerned and the Heads of their Departments.

Assistance given to other Departments, etc. The Professor again lectured on Colonial Forestry to the Colonial Administrative Cadets at both Oxford and Cambridge, and to the Colonial Agricultural Service Officers at the latter University.

Staff Tours. As briefly mentioned last year, Dr. Jones was asked by the Colonial Office to undertake an extensive tour covering parts of Uganda, Kenya, Tanganyika, Nyasaland, Belgian Congo and Nigeria to advise on the organization of research on *Chlorophora excelsa.* This he did and was away for the whole of Long Vacation, returning to Oxford in the middle of October. He has now sent his report to the Colonial Office.

At the request of the Cyprus Forest Department, Colonel Lloyd spent three months in Cyprus to advise both on mechanical methods of logging pine from steep hillsides, and on improving the existing seasoning methods for pine box-shooks to reduce the usual occurrence of fungal blue stain in local fruit box factories. Three skyline

cranes were installed and have since proved to be a profitable method of bringing out logs from the less accessible forests and also for the rapid salvaging of timber after forest fires. Colonel Lloyd was also able to pay a short visit to Turkey to advise on the mechanization of timber extraction from the Taurus mountain-side forests.

Early in July, Mr. W. R. Day also went to Cyprus, at the request of the Forest Department, to carry out some investigations into the causes of disease in pines and eucalypts. He expects to be away about six months.

Research Field Station. The Yorkshire station at Wykeham has again been used by members of the research staff. Acknowledgment is made of the continued help given by the Silviculturist (North) of the Forestry Commission and by the Research Forester, Mr. Weatherell.

Scientific Societies, etc. Members of the staff have been active on the Councils and Committees of various societies, as in previous years.

Senior Staff. There has been no change in the senior staff during the year.

Technical Staff. There are now fourteen technical assistants working in the eight laboratories. The Photographer's and Artist's sections continue to be staffed by three technicians, and the Workshops by three.

Secretarial Staff. There has been no significant change in the secretarial staff during the year.

WYTHAM WOODS

During the year 12 acres of mixed hardwoods and conifers were planted. This primary work of regenerating the large areas of open and scrub woodland will continue for some years, but the most notable event was the thinning of 400 larch poles in an oak-larch mixture of the first plantation of 1946. Thinnings and brashing of plantations on a 3-year cycle will now increase steadily and cause a material increase to the programme of thinning of the existing hardwood stands on a 5-year cycle.

Rabbits have not re-appeared since the myxamotosis attack, while squirrels are now very few. But deer do considerable damage, particularly to ash and larch plantations, while badgers have increased and damaged young plantations by uprooting young conifers.

The chief revenue has again been derived from thinnings of sycamore and ash poles for turnery work. There is little demand for the poor quality mature oak and ash which had to be removed from the planting area, but good prices for firewood made possible the removal of some over-mature and decaying timber. Only a small area of overgrown hazel coppice could be sold and felled for firewood.

Deep drainage of about 15 acres in a swampy area was found to be necessary before planting next year. Unusually heavy rainfall throughout the summer caused damage to several hillside roads which have to take considerable traffic throughout the year.

Visitors to the woods included the British Forestry Commissioners, the British Council forestry course and a party of senior students from the Land Agents' Society.

BAGLEY WOOD

The wood continued to be worked under the prescriptions of the Dedication Scheme plan of operations. Arrears in marking for thinning were considerably reduced, but actual thinning is still about two years behind schedule owing to the labour position; this will be improved by the completion of two new houses which were occupied in the autumn. The prescribed yield from thinning now exceed the needs of St. John's College, so that the College has been recommended to add two more men to the labour staff to make it possible to dispose profitably of surplus produce in a semi-manufactured condition to the public.

The young plantations under the plan show promise. Use is being made of a number of hardwoods besides oak.

In the course of a special subject study and with much appreciated help from the Forestry Commission Mensuration Section, all the Permanent Sample plots and their records were brought up to date, except the sycamore plot which is reserved for next autumn's demonstration.

In view of the probable importance to the College in 50 years' time of the stored oak coppice in Laud's copse, two Permanent Sample plots have been selected for an investigation of differential thinning of the stored oak.

A number of party visits to Bagley, included those of the Dean Forester Training School, the Short Management Course and the British Council Course.

Rabbits have not yet re-appeared in the wood.

SILVICULTURE

Dr. Jones gave the usual courses of lectures on silviculture to the first-and second-year students, in Forest Ecology to the first-year students and in Plant Ecology to Forest Officers. He also gave practical classes in silviculture in Bagley and Wytham Woods.

Dr. Jones conducted a tour of second-year students to the French and Swiss Jura (with Mr. F. C. Osmaston).

The tour for studying *Chlorophora* mentioned in last year's annual report was completed by 22nd October, and the report for the Colonial Office completed by the end of March.

ECOLOGY

Certain sites on the acid sands and gravels in the New Forest have been selected as worthy of more intensive study of the connection between vegetation and soil type. These are now being fully investigated from the standpoint of previous history, using the technique of soil pollen-analysis which Dr. Dimbleby is developing. This technique has already proved of great value in the selection of such sites; some woods which seemed to be suitable have been shown to have a chequered history which renders them useless for this purpose. In connection with this work, much experimentation has gone on concerning the most suitable methods of obtaining colour photographs of soil profiles. The techniques have to be useful in the open or under

canopy, and differences in the film used have been found to have a large effect under certain conditions.

In September, Dr. J. D. Ovington of the Nature Conservancy and Dr. Dimbleby attended as U.K. representatives an international meeting held in Wageningen to discuss what is actually known (as opposed to believed, supposed or suspected) about the effects of tree species on soil development. This meeting was preliminary to those of Section 21 at the International Union of Forest Research Organizations Congress in July. The Wageningen meeting proved very useful, particularly the field excursions. The only conclusion reached was that there is inadequate fundamental evidence available anywhere to allow even broad statements to be made about the effect of species on soil, a conclusion on which, doubtless, each representative had his own mental reservations. No further progress was made when the subject was discussed in Oxford in July, but those who made up the Wageningen party, together with several others, have been formed into a permanent working group.

The ecological work in the Allerston area this year has been mainly confined to an assessment of the experiments on hardwood establishment at the end of the first five years. This has given a measure of the performances of over forty different species; outstandingly successful to date have been several species of birch, alder and willow.

As usual, Dr. Dimbleby gave a course in Ecology to the post-graduate students. He has also given several outside lectures, notably to the University Research Society BIOS (The origin and ecological status of heathland); the Scarborough Archaeological Society (Prehistoric Soils) and the Prehistoric Society (Pollen Analysis of Terrestrial Sites).

TREE PHYSIOLOGY

Courses of lectures in Forest Soils and Tree Physiology were given by Dr. L. Leyton, together with Soil and Vegetation studies in the field.

Investigations continue into the relationship between tree growth, nutrient supply and mineral composition of the foliage with the aim of establishing foliar analysis as a means of diagnosing deficiencies in the field. In the case of young Japanese larch growing on heathland in Yorkshire, diagnoses of nitrogen deficiency and, to a lesser extent, of postassium deficiency, were confirmed by fertilizer trials. A similar investigation in a moorland plantation in S. Wales also revealed marked responses in height increment to nitrogen but not phosphorous manuring. A paper on these experiments has been presented at the International Congress for Soil Science in Paris. Other field trials with Sitka spruce and western hemlock, set up in 1955 in collaboration with H.M. Forestry Commission (Research Branch) are, as yet, too recent to assess. A preliminary trial with urea sprays on Sitka spruce seedlings has given promising responses.

In collaboration with L. Z. Rousseau, work is continuing on the influence of aeration on root growth of various tree species. Papers on certain preliminary findings with Norway spruce, Scots pine and

willow were presented at meetings of the Society for Experimental Biology and of the International Union of Forest Research Organizations.

SOIL SCIENCE

Dr. R. K. Schofield has been elected to the Readership vice Dr. E. W. Russell. Special undergraduate courses of lectures for forestry students were given by him and Mr. G. R. Clarke. As Dr. Schofield was unable to give the lectures on tropical soils, Dr. Alex Muir of Rothamsted Experimental Station kindly gave the course on this subject.

Investigations on the processes of litter decomposition and the associated release of nutrients, especially nitrogen, for plant growth were continued by Dr. W. R. C. Handley.

Enzymological studies on the release of nitrogen from the litter of various plant species under controlled conditions have been commenced.

The release of nutrients from the litter of various species decomposing in soil, as measured by the growth and composition of tree seedlings, has continued but it will be some time before this work is completed.

The release of nitrogen as ammonia or nitrate from litter has been investigated by R. T. Fenton, using a perfusion technique. Interesting differences between the behaviour of the litter of *Pinus radiata* and that of *Betula* sp. have been observed. It is hoped to publish an account of this work shortly. It is also intended that this line of work shall be considerably extended.

Work on various aspects of soil polysaccharides, for the degree of D. Phil., was successfully completed by B. Bernier and it is hoped that an account of this work will be published in due course.

Dr. H. Raudnitz has continued his work on the isolation and chemistry of the protein precipitating factors in the leaves of various species. So far the work has been restricted to constituents of *Rhododendron* leaves, as the litter of this species characteristically forms raw humus and the leaves provide a very suitable type of experimental material.

FOREST BOTANY

Mr. A. C. Hoyle continued to be Curator of the Forest Herbarium and Mr. F. White continued his work on tropical floras: the rest of the permanent staff remained unchanged.

Teaching. Mr. Hoyle gave his usual courses in Systematic Forest Botany and in the Ecology of Tropical Dry Woodlands and supervised botanical collecting by students. The collections made reached a much higher standard than usual.

One student made a special study of Regional Systematic Botany of N.W. Europe, including a field study of willow species in the Oxford district. Another prepared a Special Subject thesis on the *Systematic Position of the Elaeocarpaceae,* involving much practical work on botanical and wood characters. One student from Northern

Rhodesia completed the course in Regional Systematic Botany for that territory, as part of which he prepared an account of the *Vegetation Zones of N. Rhodesia;* an officer from Tanganyika wrote a preliminary account of the ecology of *Ocotea usambarensis* (East African Camphor) on Kilimanjaro ; a Danish graduate, K. Heiberg-Iürgensen, successfully submitted an interesting thesis on '*The factors determining the suitability of exotic species for use in plantations with special reference to intra-specific variation',* for the Diploma in Forestry.

Research and Advisory Work. Mr. Hoyle continued his study of the genus *Brachystegia,* receiving and naming several useful collections. Arrangements have been made to relieve him from various other duties, so that the study may be completed in the near future. Numerous requests for identification of timber-correlated material from the Forest Products Research Laboratory and others continued to be received. Mr. Hoyle collaborated in particular with Mr. B. J. Rendle, Messrs. Gliksten and Co., and Mr. Houlding of the United Africa Co. (Timber) Ltd. to clarify the naming of *Khaya* timbers, and with Mr. A. V. Thomas and Mr. G. H. S. Wood on some difficult Borneo Dipterocarps.

The revision of *Diospyros,* started a few years ago by Mr. White, was continued. During the year material from several parts of tropical Africa was received for naming, and the first instalment of a proposed series of papers dealing with the genus was published ; a second paper was sent to press.

Miss M. E. Griffiths completed her revision of the African species of *Terminalia* on which she successfully submitted a thesis for the B.Sc. degree. All of the African species were fully described and their distribution and ecological behaviour summarized. The work was illustrated by 27 plates of botanical drawings, and is being prepared for publication.

A Canadian graduate, Mr. K. W. Horton, devoted most of the year to an analysis of the variation patterns and taxonomic problems of two important North American species of *Picea* (*P. glauca* and *P. engelmannii*). Field work in Alberta provided a foundation, which was supplemented by many additional samples provided by the Canadian and U.S.A. Forest Departments. His thesis successfully submitted for the Diploma in Forestry, is being published.

The part-time services of Mrs. R. T. Fenton were again available for the first half of the year. Besides other help, she prepared a large collection of stained serial sections of flowers of a number of genera of Rubiaceae for use in the preparation of the key of the genera of Rubiaceae for the Northern Rhodesian Check-list.

Northern Rhodesian Check-list. The appointment of Mr. A. Angus ended on 31st December. After five years of work on the woody flora of Northern Rhodesia he left to become Plant Pathologist to the Department of Agriculture, Northern Rhodesia. The final manuscript is expected to go to press before the end of the calendar year. It has been decided to illustrate the most important keys to genera and species by 32 plates of line drawings; 16 of these have already been

skilfully executed by Miss M. E. Griffiths and Miss J. Chandler, who have also given other invaluable service.

Visitors and Enquiries. Among the visitors who worked for short periods in the Herbarium were Messrs. R. A. Blakelock, F. N. Hepper and R. W. J. Keay from Kew, Mr. J. D. Chapman of the Nyasaland Forest Service, Mons. G. C. Gilbert of I.N.E.A.C., Brussels and Mons. D. Normand of the Centre Technique Forestier Tropical, Nogent-sur-Marne, France.

Forest Herbarium. During the year 2,891 specimens were mounted and filed, and the valuable collection (850 specimens) made by Lely on the Bauchi Plateau, N. Nigeria, was remounted prior to its incorporation in the general collection. The total of 3,741 specimens mounted exceeds last year's by nearly 1,200. In order to keep pace with the greatly increased influx of material in recent years, the Mounting Staff (Mrs. Woodley) has been almost exclusively engaged in mounting, but certain other activities (labelling of correlated material, dispatch of duplicates, etc.) have fallen into arrear. Specimens received for identification number 1,447. The largest single collection (684 numbers) was that made by Mr. G. H. Pickles in Sarawak on the Oxford University Exploration Club's expedition to Borneo. Six excellently preserved and annotated sets were collected for most numbers, and, whenever available, a large quantity of correlated flowering or fruiting material preserved in spirit was also obtained. In addition, 202 timber specimens and several hundred bark specimens, all correlated with herbarium material, were supplied. Material for naming was also received from the Gold Coast, Nigeria, Nyasaland, Northern Rhodesia, Tanganyika Territory and Uganda. Named duplicates (1302) were received from various sources, principally from the East African Herbarium, the Missouri Botanic Garden, the Royal Botanic Gardens, Kew and the Forest Research Institute, Kepong. The excellent collection of 601 specimens, mainly of Dipterocarpaceae, sent by Mr. G. H. S. Wood, Forest Botanist, British North Borneo, is noteworthy.

The following territories received identifications: Gold Coast (213), Nigeria (361), Nyasaland (361), Northern Rhodesia (58), Southern Rhodesia (15), Sierra Leone (24), Tanganyika Territory (25) and British North Borneo (17). Most of the West African determinations were made by Mr. R. W. J. Keay in connection with his revision of the Flora of West Tropical Africa.

FOREST PATHOLOGY

Mr. W. R. Day continued in charge of the section, with Mr. F. H. Jones (Chief Technical Assistant) as chief assistant, together with Mr. D. K. Barrett and Miss J. S. Palmer. The usual courses of instruction were given to the Honours School and the special course in Forest Hygiene to the postgraduate students.

Research (1) *Frost Susceptibility of strains of European larch, Larix decidua* Mill. In the spring of 1956 a method to determine the frost susceptibility of plant tissues, based on that which had been developed by research workers in Canada and America on apple

varieties, was tried. Material from the European larch provenance plots at Savernake Forest was subjected to a damaging low temperature. The amount of damage caused was determined by the measurement of the electrical conductivity of a solution of the electrolytic contents of the dead cells of the frozen tissues. The criterion of injury used was the difference in mean conductivity between samples frozen and not frozen of the same provenance.

Material was tested from six different geographical origins having a wide variation in latitude and altitude. The results were in complete agreement with the work done by Mr. Day and Mr. T. R. Peace in 1936 with regard to provenances which showed the greatest difference in frost susceptibility, but showed some disagreement with those exhibiting less variation. Further experiments are to be made this autumn.

(2) *European larch die-back.* Two die-back areas in Coed-y-Brenin forest surveyed in 1947 were resurveyed with the help of the Forestry Commission. The completition of the analysis of these data has been delayed owing to the pressure of other work.

(3) *Canker investigations on European larch.* Work on the fungal ecology of larch cankers and the importance of the various organisms, has now been written up and awaits typing. The report summarizes several years' work and the analysis of the data has proved complex and time consuming.

(4) *Bark Necrosis and Moisture Investigations.* Investigation into bark necrosis on Sitka spruce, Douglas fir and Japanese larch continued. Anatomical and field study of bark necrosis on these species has stimulated an investigation into main stem and soil moisture. This work has so far been conducted only on Japanese larch but it is hoped to extend it to other species next season. Moisture samples were taken with an increment borer from main stems at positions above and between roots, and from various sites and positions in a plantation. In all, 350 samples have been dealt with and their moisture expressed as a percentage of saturation. The data now being analysed promise to give very useful information. A cursory examination shows: 1. A drop in main stem moisture saturation from spring to summer, 2. A lower saturation in the main stems on a cankered site than a non-cankered site. Soil moisture samples confirm that the cankered site was considerably the drier of the two, 3. Saturation percentages in trees growing on the edge of a plantation are usually higher than those in trees inside. Edge-trees usually escaped severe bark injury on the site investigated. Such information suggests that Japanese larch injuries could be related to a water factor but further investigation is necessary.

(5) *Sitka spruce race plots, Expt. 20. P. 29. Radnor Forest.* Advantage was taken of the thinning made in January 1956 to make isolations, by the means of an increment borer, from the main stems of freshly felled trees. An investigation into the fungal flora of living main stems growing in these plots had been made in 1950 and it was felt to be of interest to repeat this. In addition, data were collected on height increments, and discs were collected for examination. There is as yet little

or no indication of a lower height increment of dominant trees in any of the four races. Some drought crack was found to have occurred in the Oregon plot during the summer of 1955, while examination of the basal discs shows that collapse of the wood, believed to be caused by drought, occurred as early as 1938. Thanks are due to Mr. R. Ure, of the Forestry Commission Research Staff, for help in the field work.

(6) *Sitka spruce*. A visit was made to Ednol Hill, Radnor Forest, where it had been reported by the Forestry Commission that patches of Sitka spruce were dying. Investigation showed that death had been caused by the physical condition of the soil prevailing in the affected areas. Such conditions affected root development and action, and consequently water supply. A report has been prepared and a copy sent to the Forestry Commission.

FOREST ENTOMOLOGY

Mr. G. H. Thompson continued in charge of this section in which no staff change occurred. The usual undergraduate courses were given in Forest Zoology and Animal Ecology. One Forest Officer undertook an advanced study in entomology, which was also chosen as their optional 'special subject' by six undergraduates.

Research. Completion of a preliminary insect/host-tree list for the Gold Coast still awaits the receipt of a number of identifications.

The third annual examination was made of ash and sycamore billets laid down in 1953 in Wytham Wood for the study of insect succession. The bark of the sycamore had mostly fallen away; in the ash the bark was loose but intact. In both species, apart from incipient decay in the sapwood, the wood was hard. The fauna was even more scarce than in 1954, both in number of species and individuals, and was restricted to the outer surface and beneath the bark the wood not being attacked. Living larvae of *Hylesinus crenatus* were found beneath an area of tight bark on one ash billet, but attack by *H. fraxini* was everywhere extinct.

Ecological studies continued on the alder woodwasp (*Xiphydria camelus* L.) and its parasites, *Aulacus striatus* Jur., *Pseudorhyssa alpestris* Holmgren, *Rhyssella curvipes* Grav. and *Xiphydriophaga meyerinckii* Ratz. The main details of the life history have been worked out for the woodwasp and parasites. *Pseudorhyssa alpestris* appears to be a hyperparasite of *Rhyssella curvipes,* the other species are primary parasites of the woodwasp. The presence of a fungus-carrying organ has been confirmed in the adult female woodwasp and the fungus has been cultured; identification is awaited. A photographic record of the main features of the above study was commenced. This was greatly facilitated by the use of electronic flash in conjunction with a counter-weighted wall fitting carrying a Kine Exakta camera with bellows.

MANAGEMENT

Forest management remained in the charge of Mr. F. C. Osmaston and the courses for undergraduates were unchanged. The first-year course included 24 lectures, a tour in the forests of Normandy and the

Landes in April and four weeks of practical work in the New Forest in September. In the second-year there were sixteen lectures, two weeks in the New Forest in March and, in April, a tour in the French and Swiss Jura.

Lectures were given by Mr. F. C. Osmaston, helped by Mr. T. E. Edwardson and Mr. W. A. Gordon, who concentrated on aspects particularly relevant to Britain and the Colonies, respectively.

The practical work in the New Forest comprised field work for the preparation of a full working plan by each student for an area of 527 acres. The area was selected to provide variations in site conditions and a growing stock of both conifers and hardwoods with quality and age-class distributions typical of many British woodlands. The students were, therefore, presented with the familiar problem of choice of species according to site, conversion or retention of mature hardwoods, satisfaction of amenity demands and the attainment of sustained annual yields.

In September the soils and site conditions were described and assessed, the growing stock described, enumerated and its increment calculated so that Parts I of their plans could be written. After criticism and return of their Parts I, the students were given the objects of management so that they could complete the prescriptions of their plans (Part II) during the two final weeks of field work in March when previous field work could be checked and application of prescriptions examined.

Supervision and assistance to post-graduate students were also given, such as the assessment of stands and sites with the aid of aerial photographs in Cyprus and management policies in India and Kashmir. A two-week tour in Sweden exemplified the importance in management of the integration of industry dependent on forest products, as well as the classification of stands by development classes and the methods employed to retain and increase the efficiency of a scarce labour force.

MENSURATION

Teaching. The undergraduate course, including practical work in Bagley Wood, was given by Mr. T. E. Edwardson. An advanced course on selected points in Mensuration was given to post-graduate students. Six permanent sample plots were measured in Bagley Wood in the year. A special subject study by an undergraduate of a method of standing volume determination based on thinnings and low-level measurements on standing sample trees gave satisfactory results. This means that conifer plots can be maintained without the need for skilled climbers or expensive dendrometers.

Research. The initial establishment of permanent yield plots in Dean and Highmeadow woods was completed by Mr. Edwardson with the help of a Forestry Commission Mensuration Branch field party. There are now 475 plots totalling 1,274.5 acres and representing 10,718.1 acres of forest.

Analysis of the outstanding data is in hand in the Department of the Reader in Design and Analysis of Scientific Experiment, and Mr. Edwardson has drafted an interim report on the project.

Supervision was given to an advanced study on 'Inventory Investigations in the *P. brutia* forests of Cyprus'.

Miscellaneous. Mr. Edwardson also gave lectures on aspects of British forestry to Denman College and Longworth Forum.

AERIAL SURVEYS

The course in aerial surveys for post-graduate students was given jointly by Major-General R. Ll. Brown of the Survey Department and Mr. F. C. Osmaston. The course included a special visit to the Colonial Directorate of Surveys at Tolworth when the whole process of map making from aerial photographs was seen. Mr. R. G. Miller, in charge of the Forestry Centre of the Directorate also gave at Oxford a special lecture on the use of aerial photographs in forestry.

STATISTICS

By arrangement with the Reader in the Design and Analysis of Scientific Experiment, Mr. J. Fraser Scott gave a course of lectures on elementary statistics for Forestry students.

Computing Officer. Mrs. Allington's services in computing have been in considerable demand, but she has had a certain amount of time free for helping with other work, notably the preparation of diagrams and in the general store of glassware, chemicals, etc.

WOOD ANATOMY

Dr. L. Chalk continued in charge of the Section, with Mr. A. A. Shaw and Mr. P. G. H. Franklin as his assistants. The usual undergraduate and post-graduate courses were given. Two undergraduates carried out their 'special subjects' in this subject.

Research (1) *Density of the wood of Pinus patula grown in Kenya.* Mr. G. Fry made a study of variation of density in relation to age from pith and ring width on material collected for the purpose in Kenya. It was found that both factors are significant but that the influence of age from the pith decreases markedly after 10 years or so. It was also shown that the early wood was very thick walled—comparable to early latewood in temperate woods—so that the difference in density between early and late wood was very small. Consequently, the proportion of latewood has little effect on the density.

(2) *The systematic position of the Elaeocarpaceae.* The Elaeocarpaceae are usually placed in the Malvales and closely associated with the Tiliaceae, but there is some reason for suspecting a relation between some of the genera of the Elaeocarpaceae with genera such as *Kiggelaria* of the Flacourtiaceae. The wood structure indicates that the genera *Dicraspodia* and *Muntingia* of the Elaeocarpaceae should be placed in the Tiliaceae, and that the Flacourtiaceae are the most unspecialized of these families and the Tiliaceae the most specialized, with the Elaeocarpaceae only slightly more specialized than the

Flacourtiaceae. From the evidence of both the botanical characters and of the wood it was tentatively concluded that, apart from *Micradesma* and *Muntingia,* the Elaeocarpaceae should be placed in the Parietales, but as a family separate from the Flacourtiaceae.

(3) *Moisture in the living tree.* A further set of samples from Sitka spruce, collected by the Forestry Commission during the summer is being studied.

(4) *Terminology.* Dr. Chalk circularized members of the International Association of Wood Anatomists concerning the revision of the Glossary and collated their suggestions. The I.U.F.R.O. Congress at Oxford afforded an opportunity for a meeting in person with the members of the Committee appointed to prepare the new Glossary. Very satisfactory progress was made and what is hoped will be a final draft was approved, with the exception of terms for bark, which it has only recently been decided to include. The revised list of terms and definitions have been made available for the Commonwealth Forest Terminology, Part II.

The Wood Collection. The principal additions to the collection received during the year were from North Borneo (per Mr. G. H. S. Wood), Yale School of Forestry (per Prof. W. C. Stern), the Forest Products Research Laboratory, Princes Risborough and the Director, Jardim e Museu Agricola do Ultramar, Lisbon. A very valuable collection of microscope slides was received from the Yale School of Forestry.

FOREST ECONOMICS

Mr. J. J. MacGregor continued in charge of this section. Mr. T. W. Irvine and Mr. F. E. Balman were mainly concerned with the surveys of forestry costs and prices of private estates. Miss J. M. Johnson took over the secretarial work of the section at the end of July, 1955.

Teaching. Courses in Economic Theory and in Forest Economics were given to the Final Year students. Seminars and study groups of forest officers were also arranged. He also gave a talk to the Didcot branch of the Townswomen's Guild on 'Forestry and the Public'.

Research. The Forest Economics of Private Estates. About seventy estates in England and Wales continue to provide detailed economic data which have been used in the compilation of the Fourth Annual Report on Private Forestry Costs covering the forest years 1953-54 and 1954-55. A study on timber prices and marketing was based on about 1,000 separate sales of home grown timber, provided from about 130 different sources, and this was published as Survey of Private Forestry Prices, Second Report, 1955.

Supervision. During the year the following theses or special subjects were supervised: competition between forestry and agriculture; the economics of land owning in the nineteenth century; prospects for British Columbian timber in the United Kingdom; forestry taxation; wage studies; the bearing of European forestry policies on the development of forestry in West Bengal; the rôle of softwoods in Southern Rhodesia.

Committees. The Forest Economist is a member of the Oxon and Bucks Divisional Committee of the Royal Forestry Society of England and Wales. At the 12th Congress of the International Union of Forest Research Organizations in Section 31 (Forest Economics) he served on a committee on labour productivity.

FOREST LAW, TAXATION AND ADMINISTRATION

British Forestry. Mr. W. A. Gordon gave a course of 20 lectures on Land Tenure and Taxation to a class of 7 senior year undergraduates, 4 postgraduates and 1 student from the Law Faculty. Five candidates took and passed in this as their additional subject in the Final Honour School of Forestry.

Mr. J. D. Davies, Law Tutor of St. Catherine's, also conducted a course of 2 seminars on the Laws of Evidence and Contract.

Colonial Forest Administration. Mr. Gordon gave a course of 10 lectures to a class which rose to 20 from an initial 10 students. Seven candidates took and passed in this as their additional final subject in the Final Honour School of Forestry.

In addition Mr. Gordon gave 3 lectures on Forest Management with special reference to the Colonial aspects and 2 lectures to first year students on Forest Protection with special reference to the legal aspects.

FOREST UTILIZATION AND ENGINEERING

The usual undergraduate course was given in Utilization and a course of lectures and field work in Forest Engineering.

Lectures were given to the Colonial Forest Officers on the grading of hardwoods, the selection and uses of modern cutting tools and felling saws for tropical timber, and discussions were held on tractors and other mechanical equipment for timber extraction. The usual course in the maintenance and sharpening of saws was given in the Institute workshops. By arrangement with the City of Oxford School of Engineering, ten Colonial and Indian Forest Officers attended a course of eight lectures and 16 hours of practical work on the maintenance and repair of motor vehicles. We have to thank the City of Oxford for making these facilities available to Forest Officers and, owing chiefly to the greater range of equipment available, this practical experience in the workshops was found to be of more direct value than the R.E.M.E. course in vehicle maintenance formerly attended.

The Colonial Forest Officers visited the furniture factory and timber seasoning plant of Messrs. E. Gomme Ltd., of High Wycombe, and the timber yards, veneer show rooms and sawmills of Wm. Mallinson and Sons, Ltd. The Weyroc Chip-board factory, at Weybridge, Surrey, was also visited. Second year students spent a day at the Forest Products Research Laboratory, Princes Risborough, and also at Messrs. Plumridge Sawmills at High Wycombe. Several Forest Officers also visited the Forest Products Research Laboratory to discuss particular subjects.

During the Colonial Forest Officers' tour to Sweden, they visited sawmills, pulp and fibre-board factories, and were also able to see developments in mechanization of timber extraction, as well as mechanization of nursery equipment and the making of ditches with explosives.

At the annual demonstration of forestry equipment at Bagley Wood several new types of winches, cranes and other devices for the extraction and loading of timber were shown. New items included a light portable logging winch, recently developed by the Forestry Commission, and an even smaller winch, driven from the engine of a chain-saw. A 'Drott' log-loader, attached to a new type of B.T.D. crawler tractor, picked up and carried bundles of poles and light logs to roadside. A quick method of clearing light scrub forests was demonstrated by the Wilder-Rainthorpe mobile chopping machine which completely cleared an area of coppice, including birch and willow shoots up to 3 ins. diameter, and left the cleared area strewn with short disintegrated pieces of brush-wood and ready for immediate planting.

A system of extracting thinnings and small poles from hillside plantations by gravity, along a single wire, was inspected in Forestry Commission softwood forests in the Lake District. This method originated in Canada about five years ago and was especially designed for pulp-wood extraction. It has proved to be practicable on suitable gradients and for small loads up to distances of 500 yards.

At the request of the Cyprus Forest Department, Colonel Lloyd spent three months in Cyprus to advise on mechanical methods of logging pines from steep hillsides, and also on improving existing seasoning methods for pine box-shooks to reduce the usual occurrence of fungal blue stain in local fruit box factories. Colonel Lloyd also paid a short visit to Turkey to advise on the mechanization of timber extraction.

Several members of the Institute staff in collaboration with the Commonwealth Forestry Bureau devoted much time to work on the draft of Part II of the Forest Terminology covering terms used in Forest Products Research, Extraction, Utilization and Trade.

FOREST PROTECTION

The usual course of lectures on forest protection was given to first-year students by Colonel A. H. Lloyd, Mr. J. J. MacGregor and Mr. W. A. Gordon. Mr. Gordon paid particular reference to the legal aspects of the subject.

SURVEYING

The usual course in surveying was given in the Trinity Term. This year the course was given by Mr. A. R. Robbins, of the Department of Surveying, who has now returned to Oxford.

LIBRARY

Miss G. Guiney continued in charge of the Library, with Mr. E. F. Hemmings maintaining the Catalogues, and Miss D. R. Castell as assistant.

Statistics, with comparable figures from last year are:

Accessions:			
Issues of periodicals	2171	(1801)	
Current annual reports ...	191		
Books	150	(142)	
Miscellaneous items	1035	(958)	
			3547 (2901)

The Commonwealth Forestry Bureau deposited 361 (442) items; the number acquired by direct request was only 46 (130) chiefly because the request-routine was interrupted by several short-term changes in the clerical staff.

Loans:			
To staff:			
Periodicals			
in circulation	2799	(2682)	
direct	313	(315)	
Books	226	(372)	
Other items	323	(321)	
			3661 (3690)
To Students:			
Periodicals	257	(617)	
Books	1180	(1268)	
Other items	472	(711)	
			1909 (2596)
To Bureau Staff:			
Periodicals	367	(215)	
Books	39	(87)	
Other items	269	(56)	
			675 (358)
To visitors and correspondents:			
Periodicals	304	(281)	
Books	69	(83)	
Other items	241	(214)	
			614 (578)
		Total loans:	6859 (7222)

New Periodicals entered totalled 12, one each from Denmark, Finland, France, Germany, India, International: F.A.O., Brazil, Israel, New Zealand, Nyasaland, Roumania, the United Kingdom and the United States of America. (The journal from France is *Le Chêne*, published between 1909 and 1934 only).

New Series entered, including Annual Reports, came from 26 countries: Bolivia (1), Bulgaria (1), Canada (3), Finland (2), Germany (5), Hungary (1), India (2), International (4, i.e. 1 A.E.T.F.A.T.,

Paris; 2 F.A.O., Rome; 1 F.A.O., Thailand), Iran (1), Italy (1), Japan (3), Malaya (1), Morocco (1), Netherlands (2), New Zealand (2), Northern Ireland (1), Puerto Rico (1), Sweden (1), Surinam (1), Tanganyika (2), Thailand (1), Turkey (2), Union of South Africa (1), United Kingdom, except Northern Ireland (7), U.S.A. (5), Yugoslavia (2). (54 in all).

A survey shows that the library now holds about 9,500 books; 381 sets of periodicals, 224 of these being current in 24 languages, namely: 1 Bulgarian, 1 Burmese, 4 Czech, 3 Danish, 1 Dutch, 132 English, 1 Finnish, 14 French, 25 German, 2 Greek, 2 Hebrew, 1 Hungarian, 1 Indonesian, 3 Italian, 2 Japanese, 2 Norwegian, 8 Portuguese, 3 Roumanian, 4 Russian, 3 Serbo-Croat, 1 Siamese, 3 Spanish, 5 Swedish, 2 Turkish; 1508 sets of series (official bulletins, etc.), from 96 countries, 673 organizations and 28 international bodies; 545 sets of reports (regular, mainly annual), general reports from 124 countries and provinces; 822 working plans; 450 maps.

Correspondence. Letters sent 1858 (1660); received 996 (1056).

Sales of Institute publications in the library or by post realized £88 16s. 8d. (£122 12s. 11d.).

Catalogue Room. Mr. Hemmings reports that during the year, 23,372 (24,117) cards were added to the 'Oxford' catalogue; of these, 15,814 were filed in the subject or geographical catalogues, and 7,558 went into the author catalogue, while 380 cards were filed in the 'Flury' catalogue.

The catalogue was completely respaced. Bureau corrigenda slips were dealt with, and many amendments were made to catalogue cards as the Library received items previously referenced from other sources. 486 new guide cards were inserted.

In view of the great growth of the Commonwealth Forestry Bureau's Centralized Title Service, there was a switch-over to Multilith printing in October 1955. During the year some 272,504 (141,998) cards and flimsies were produced and distributed to 60 (33) recipients, some of whom subscribe to two or more sets.

All duplicate stock was sorted and arranged. New shelving was erected in the Library basement. Respacing of the contents of the Library stack is now in progress.

Staff. In September, Miss Sylvia Bishop resigned. Temporary assistants were employed, to two of whom, Mrs. Mary Helleiner and Mrs. Joy Horton, special thanks are due. At the end of the year we were able to re-engage Miss Bishop as Library Clerk.

General. A pair of map cabinets, each capable of storing a thousand maps, was installed. A detailed card-catalogue, arranged geographically, indicates the relevant map-number. The map collection can now be gradually expanded. Exhibitions were mounted in the library for special occasions, including a visit by Library Association members. The Library Bulletin continued to appear and its distribution list to increase. An analysis was prepared to show which journals were chiefly used by staff-members, students, Bureau staff, and outside borrowers. The current journals on display in the library are now

protected by stiff transparent covers, a marked improvement in appearance and utility.

The customary introductory talks and demonstrations were given at the opening of the academic year to Forest Officers, postgraduates, probationers and first-year students.

The number of single visitors increased considerably. A proportion of these spent two or three days, to consult references. Amongst others, we welcomed Dr. J. A. Zivnuska (School of Forestry, University of California), Dr. M. Inouye (Hokkaido), Senoritas Garcia de Dios and Gonzalez Martinez (Consejo Superior de Investigaciones Cientificas, Madrid), Monsieur Duplaquet (French Forest Service), Dr. A. Huber (F.A.O.), Dr. E. Meijer Drees (Indonesia), Mr. K. G. Trotzig (Sweden), Dr. Inal (Instanbul), Mr. Aung Din (Burma), Monsieur le Comte de Serionne (Paris).

Gifts. Grateful acknowledgment is again due to many benefactors. Donors of particular items were: Mr. L. A. M'Naught (Oban), who presented his complete set of the *Transactions of the Foresters' and Gardeners' Society of Argyll*, 1909-14; Dr. R. E. Schultes (Harvard University); the Chief Librarian, U.S. Department of Agriculture. the 1941 Yearbook long out of print; Kustannos Ov. (Helsinki), *Finnish Timber Men*; the U.S. Forest Service, 25 issues of the *Forest Worker* 1924-31; the Nyasaland Society; Professor Pavari, Arboles Forestales Argentinos; Professor Sukachev, Russian papers read at the World Forestry Congress, 1954; Professor H. Gaussen (Toulouse), 2 papers otherwise unobtainable; Departmento Agro-Meteorologia (Buenos Aires), *Boletin Fenológico* since 1954.

PHOTOGRAPHIC SECTION

The photographic section, staffed by Mr. H. F. Woodward and one assistant, has during the past year processed 5,850 prints and enlargements, 1,140 negatives, 70 lantern slides and taken 316 photographs and photomicrographs. The section has also dealt with a miscellany of special jobs including photographic stencils, dry mounting and heat sealing of notices, direction cards, etc. Work on the print and lantern slide collection has continued, also the operation and maintenance of the projection equipment. Duplicating work amounted to 68,000 impressions and a considerable number of lecture notes, library bulletins, etc. produced in colour on the spirit duplicator. The section was responsible for staging an exhibition of photographs of staff and students of the past 50 years, in connection with the Jubilee celebrations, and during the I.U.F.R.O. Conference provided a document printing service, enabling reports of discussions and meetings to be distributed to the delegates shortly after each session.

WORKSHOPS

Two metal workers, Mr. E. J. Howell and Mr. A. A. Bowman, and one wood worker, Mr. J. Howkins, continued in the workshop. Work for nearly all sections of the Institute was done and major items included:

Woodwork:

A map case and 5 index card cabinets for the library, 60 breeding cages for Entomology, a Drawing Office unit and a combination drawing table and cupboard for Mensuration.

Metalwork:

For Entomology, 2 electronic flash light stands and an adjustable table and stage for camera equipment, 12 copper trays with moats for Microbiology and reconstruction of a muffle furnace for Physiology.

H. G. Champion,
Professor of Forestry

APPENDIX I
PUBLICATIONS
GENERAL

Original Publications

Shelterbelts and their effects, by H. G. Champion. Paper presented to Section 11, 12th Congress, International Union of Forest Research Organizations, 1956 (IUFRO 56/11/103).

University of Oxford School of Forestry, by H. G. Champion. *Nature,* 176:721.

Amenity Forestry, by T. E. Edwardson. *Forestry,* 29:44-52.

Agriculture and Forestry, by W. A. Gordon. *Tropical Agriculture,* 33:171-75.

Forestry in Great Britain, the Commonwealth and Europe, by A. H. Lloyd, *Encyclopaedia Britannica 'Book of the Year'.*

SILVICULTURE

Original Publication

Ecological Studies on the Rain Forest of Southern Nigeria: IV. The Plateau Forest of Okomu Forest Reserve, by E. W. Jones. *Journal of Ecology,* 43:564-94 and 44:83-117.

ECOLOGY

Original Publications

The Occurrence of Podzols under Deciduous Woodland in the New Forest, by G. W. Dimbleby (with J. M. Gill), *Forestry,* 28:95-106.

Pollen Analysis as an Aid to the Dating of Prehistoric Monuments, by G. W. Dimbleby. *Proc. Prehist. Soc.* (1954) 20:231-36.

The Importance of Historical Checks in Interpreting the Effect of Vegetation upon Soil Development, by G. W. Dimbleby. Paper presented to Section 21, 12th Congress, International Union of Forest Research Organizations, 1956 (IUFRO 56/21/16).

The relationship between the growth and mineral composition of the foliage of Japanese larch (*Larix leptolepis* Murr.), by L. Leyton. *Plant and Soil,* 7:167-77.

Mineral composition of the foliage in relation to the growth of Scots pine, by L. Leyton (with K. A. Armson). *Forest Science,* 1:210-18.

The mineral requirements of forest plants, by L. Leyton, *Handbook of Plant Physiology,* Vol. 4 (in press).

Aeration and Root Growth in Tree Seedlings, by L. Leyton. Paper presented to Section 21, 12th Congress, International Union of Forest Research Organizations, 1956 (IUFRO 56/21/5).

Reviews

Analysis of soils and plants for foresters and horticulturists, by S. A. Wilde and G. K. Voigt. J. W. Edwards Inc. Ann Arbor, Michigan, 1955. *Empire Forestry Review* 34:410 (*L. Leyton*).

Amount and chemical composition of the organic matter contributed by overstorey and understorey vegetation to forest soils, by D. R. M. Scott. Yale Univ. Sch. For. Bull. No. 62, 1955. *Empire Forestry Review* 35:97 (*L. Leyton*).

BOTANY

Original Publication

Notes on the Ebenaceae: 1. The genus *Maba* in Africa, by F. White. *Bull. Jard. Bot. Etat. Brux.* 26:237-46.

PATHOLOGY

Unpublished reports (in typescript)

Dying of Sitka Spruce, Ednol Hill, Radnor Forest, by W. R. Day. (7 pages), (April, 1956).

The failure of Sitka spruce in North-Western Europe, by W. R. Day. (63 pages), (July, 1956).

Further bark necrosis on main stems of Japanese larch, by D. K. Barrett (6 pages) (July, 1956).

FOREST MANAGEMENT

Review

The Planning of Managed Forests by the Experimental Method and especially the Check Method, by H. E. Biolley, translated by Mark L. Anderson. *Scottish Forestry,* 10:173 (*F. C. Osmaston*).

FOREST MENSURATION

Review

Forest Mensuration, by Prof. H. A. Meyer, *Forestry,* 28:155-56 (*T. E. Edwardson*).

AERIAL SURVEYS

Original Publication

The Development of Photo-interpretation in Forestry, by G. W. Dimbleby. *Aerial Survey Review,* 10:2.

WOOD ANATOMY

Original Publications

A review of changes in the terminology of wood anatomy, by L. Chalk. *Tropical Woods,* 102:1-11.

Fibre length in storeyed hardwoods, by L. Chalk, E. B. Marstrand and J. P. de C. Walsh. *Acta Bot. Neerlandica,* 4:339-47.

The distribution of moisture in the living stem in Sitka spruce and Douglas fir by L. Chalk and J. M. Bigg. *Forestry,* 29:5-21.

Artificially induced tension wood in Ash, Birch and Poplar, by D. F. Dyer. *Journal of the Oxford University Forestry Society,* Fourth Series 4:19-23.

FOREST ECONOMICS

Original Publications

Principles of Land Tenure in England and Wales, by J. J. MacGregor. Land Tenure Proceedings of the International Conference on Land Tenure and Related Problems in World Agriculture. Held at Madison, Wisconsin, 1951. *The University of Wisconsin Press,* 1956. Pp. 360-74.

Private Forest Problems, by J. J. MacGregor. Leading article in the *Financial Times,* Nov. 28, 1955.

Production in the Swedish Sawmill Industry, by J. J. MacGregor. *Forestry,* 29:119-36.

Forestry Costs on Private Estates, by J. J. MacGregor. Paper presented to Section 31, 12th Congress, International Union of Forest Research Organizations, 1956 (IUFRO 56/31/6).

Woodland Accounts and Costing, by J. J. MacGregor, F. E. Balman and T. W. Irvine. *Quarterly Journal of Forestry,* L:197-204.

Survey of Private Forestry Prices, England and Wales, 1955, by J. J. MacGregor, F. E. Balman and T. W. Irvine. August, 1956. 39 Pp. *Department of Forestry, University of Oxford.*

Review

Economic Analysis of Farm Forestry Operating Units, by S. L. Barraclough and E. M. Gould. Bulletin No. 26, Harvard Forest, Petersham, Massachusetts. *Empire Forestry Review,* 34:406-08 (*J. J. MacGregor*).

FOREST LAW

Original Publication

The Law of Forestry, by W. A. Gordon. H.M.S.O. 574 Pp. £3 10s. 0d.

FOREST UTILIZATION AND ENGINEERING

Original Publication

Notes on new types of winches, cranes, and other devices for extracting and loading logs demonstrated under the auspices of the Imperial Forestry Institute, at Oxford, by A. H. Lloyd. *Wood,* 21:228-9.

Unpublished Report

Report on Forest Utilization in Cyprus, 1955, by A. H. Lloyd.

APPENDIX II

I. STAFF ENGAGED IN INSTRUCTION AND RESEARCH

PROFESSOR SIR HARRY CHAMPION, C.I.E., M.A., D.Sc. (Oxon.). Tropical Forestry, Forest Policy.

L. CHALK, M.A., D.Phil. (Oxon.). Wood structure and Properties.

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G. H. THOMPSON, B.Sc., M.A. (Oxon.). Forest Zoology, Entomology.

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J. J. MACGREGOR, B.Sc. (Glasgow), M.S. (Wisc.), B.Litt., M.A. (Oxon.). Forest Economics.

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F. WHITE, M.A. (Oxon.), M.A. (Cantab.), Forest Botany.

A. ANGUS B.Sc. (Edin.), Forest Botany (Until 31 December, 1955).

II. STAFF OF OTHER UNIVERSITY DEPARTMENTS ASSISTING IN INSTRUCTIONAL WORK

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G. R. CLARKE, B.Sc., M.A. (Oxon.). Soil Science.

MAJOR-GENERAL R. Ll. BROWN, M.A. (Oxon.). Aerial Survey.

A. R. ROBBINS, B.Sc., M.A. (Oxon.). Surveying.

J. FRASER SCOTT, M.A. (Oxon.). Statistical Methods

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